Rev. J. E. T. Woods, on the relations of the Brisbane flora; and, with the assistance of F. M. Bailey, a census of the flora of Brisbane, including the plants of Moreton Island and the country within twenty-five miles of the city of Brisbane; the total number of species enumerated is 1,228.—E. Meyrick, descriptions of Australian micro-lepidoptera. Part 2. Crambites. —James Hobson, notes on *Cypræa guttata*; gives as the habitat of this extremely rare shell, New Britain, but few particulars are given.

Journal de Physique, February.—On the determination of the elements of a vibratory movement, by E. Mercadier.—On the law of the thermal capacities of gases, by N. Slonginoff.—Atmospheric polarisation and influence of the terrestrial magnetism on the atmosphere, by H. Becquerel.—On the differential equation $\frac{d^2u}{dt^2} = a^2\frac{d^2x}{dt^2}$, which leads to the theoretic expression of the velocity of sound, by M. Amagat.

SOCIETIES AND ACADEMIES

LONDON

Royal Society, March 18.—"On the Structure of the Immature Ovarian Ovum in the Common Fowl and in the Rabbit. To which is appended some Observations upon the Mode of Formation of the *Discus proligerus* in the Rabbit, and of the Ovarial Glands or 'Egg-tubes' in the Dog." By E. A. Schäfer, F.R.S.

"On the Modifications of the Spectrum of Potassium which are Effected by the Presence of Phosphoric Acid, and on the Inorganic Bases and Salts which are found in combination with Educts of the Brain." By J. L. W. Thudichum, M.D., F.R.C.P.L. Communicated by John Simon, C.B., F.R.S.

"Researches into the Colouring Matters of Human Urine, with an Account of the Separation of Urobilin." By C. A. MacMunn, B.A., M.D. Communicated by A. Gamgee, M.D., F.R.S., Brackenbury Professor of Practical Physiology and Histology in Owens College, Manchester.

"On the Coalescence of Amœboid Cells into Plasmodia, and on the so-called Coagulation of Invertebrate Fluids." By P. Geddes. Communicated by Prof. Burdon Sanderson, LL.D., F.R.S.

Zoological Society, March 16, Dr. A. Günther, F.R.S., vice-president, in the chair.—Mr. W. K. Parker, F.R.S., exhibited and made remarks on the eggs and embryos of some crocodiles (*Crocodilus palustris*), obtained in Ceylon by Dr. W. R. Kynsey, Principal Medical Officer of Colombo.—Mr. W. A. Forbes read a paper on some points in the anatomy of the Sumatran rhinoceros.—Mr. Edward R. Alston exhibited and made remarks on a coloured drawing of an adolescent specimen of *Tapirus dowi*, now in the Paris Museum.—Mr. Alston also exhibited a specimen of a remarkable and little known Australian marsupial, *Antechinomys lanigera* (Gould).—A communication was read from Mr. L. Taczanowski, giving the descriptions of a collection of birds made in Northern Peru by Mr. Stolzmann during the last months of 1878 and the first half of 1879. Amongst them were examples of three species believed to be new to science, and proposed to be called *Turdus maranonicus*, *Arremon nigriceps*, and *Colaptes stolzmanni*.—Mr. Alfred E. Craven read descriptions of three new species of land and fresh-water shells, from Nossi-Bé Island, N.W. coast of Madagascar. —Mr. Craven also read a paper on a collection of land and fresh-water shells, made during a short expedition to the Usambara country, in Eastern Africa, with descriptions of seven new species.—Mr. F. Jeffrey Bell read some remarks in reference to certain statements made by Mr. A. Agassiz in a paper on the synonymy of the echini, communicated to the Society at a previous meeting.—Mr. W. K. Parker, F.R.S., read a paper on the structure of the skull in the chameleons.

Geological Society, March 10.—Robert Etheridge, F.R.S., president, in the chair.—John Ward was elected a Fellow, and Prof. F. von Hochstetter, of Vienna, and Prof. A. Renard, of Brussels, Foreign Correspondents of the Society.—The following communication was read:—On the geological relations of the rocks of the south of Ireland to those of North Devon and other British and Continental districts, by Prof. Edward Hull, F.R.S., Director of the Geological Survey of Ireland. In this paper the author, after referring to his previous paper on the geological age of the Glengariff beds (*Quart. Journ. Geol. Soc.*, vol. xxxv. p. 699), in which he showed that between them and the succeeding Old Red Sandstone in the south of Ireland there existed a very great hiatus, proceeded to compare the sections of the rocks of the south of Ireland with those of North Devon, and to show that the hiatus in question is represented in the latter locality by the whole of the Middle and Lower Devonian rocks. He then discussed the relations of the Devonshire rocks to those occurring north of the Severn, in Scotland, and in Belgium; and from this review of the whole question he arrived at the following conclusions:—1. That there is only one Old Red Sandstone properly so-called—represented in Devonshire by the Pickwell-Down Sandstone; in Ireland by the so-called Upper Old Red Sandstone, including the Kiltorcan beds; in Scotland by the so-called Upper Old Red Sandstone; and in Belgium by the "Psammites du Condroz." 2. That the so-called Old Red Sandstone of Herefordshire is the estuarine representative of the Middle and Lower Devonians of Devonshire; and that the so-called Lower Old Red Sandstone of Scotland, with its fish-remains, is the lacustrine representative of the Upper Silurian rocks. In conclusion the author discussed the physical conditions under which these various formations were deposited.

Physical Society, February 28.—Prof. W. G. Adams in the chair.—A paper was read by Mr. Ridout on some effects of vibratory motion in fluids. It was found by Savart and Tyndal that jets of water were sensitive to notes or air vibrations like flame, and the author conceived the idea of vibrating the jet of water internally. To do this he caused an electro-magnetic arrangement to pinch the tube, conveying the water 400 to 500 times per second, so as to communicate a vibratory motion to the stream of fluid. The issuing jet spread out in two streams, beautifully broken into drops, and representing the fundamental note. When the pinching lever vibrated irregularly harmonics were observed. When the water was thrown into vibration in two different planes, the resulting jet rotated in the tube. Froude's deduction that a liquid moving in a tortuous tube has a tendency to straighten the tube was illustrated by oscillating a pipette with its nozzle in a vessel of water, and filling a coloured liquid into it, which is seen to flow from the nozzle through the water in a tortuous line. By giving the pipette also a motion round its axis, the line becomes a spiral. A sounding body produces no disturbance in the stream. The author also showed that the cardboard experiment of M. Clement Desormes can be extended to water. In this experiment a cord is attracted to another cord by blowing a jet of air through the latter upon the surface of the former. Mr. Ridout allows a jet of water to flow out of a glass tube with a cup-shaped mouth upon the surface of a glass ball, and when the ball is within a certain distance of the mouth, it is attracted towards the latter and sticks in the mouth. In explanation of this fact it was shown that the ball and cup remained in such a position that the outflow of water was greater than if the globe had been entirely absent. Prof. Perry explained this action by the hydrodynamical fact that the pressure is less at the centre of the mouth of the cup than at the edges. Prof. Guthrie said that he had tried a similar experiment with a funnel-shaped mouth and a glass cone, but failed. He surmised that perhaps the cohesion of the water for itself, as it formed a shell round the ball, might help to cause the success of the ball method. Prof. Adams pointed out that with the cup and ball there was less difference of head of water between the centre of the mouth and the edge where the water escaped, than with the funnel. Dr. Stone stated that he had been able recently to imitate many physiological sounds, such as the murmur of the heart, by means of constrictions, in tubes through which water and air were flowing. His demonstrations were made before the Royal College of Physicians.—Dr. C. W. Wright then read an important paper on a determination of chemical affinity in terms of electromotive force. After giving a history of the subject, he described his original experiments. These consisted in performing electrolysis of sulphuric acid and measuring the heat evolved in the process, and by recombustion of the materials. A voltameter with spade-shaped platinum electrodes soldered to stout copper wires, and sealed by a large plug of gutta-percha, was employed for the electrolysis. An ordinary water calorimeter was used to measure the heat given off, as Bunsen's was found to contain sources of loss of heat. The strength of the current employed was varied from 6 webers to $\frac{6}{10}$ weber. The volume of gas produced was measured by Joules's plan. Radiation loss was corrected for by three methods. From an average of eighteen experiments the value of e, the electromotive force was found to be 1·5038 C.G.S.

or volts Taking the formula $\mathcal{J} = \frac{e}{(H+n)\chi}$, where $\mathcal{J}$ is Joules's equivalent, H is the heat actively evolved, n the heat evolved by recomposition, and χ a constant to which Kohlrausch gives the value of ·00105, Dr. Wright finds that Joules's equivalent should be $4{\cdot}196 \times 10^7$, instead of $4{\cdot}20 \times 10^7$, as given, to answer the formula. The author thinks that Joules's water-friction experiments gave the truest value of $\mathcal{J}$, and that his electric heating experiments gave a result about ½ per cent. too low, owing to the B.A. unit of resistance being about 2 per cent. too high and other causes.

Chemical Society, March 18.—Mr. Warren De la Rue, president, in the chair.—Prof. Tidy read a paper of over 100 pages on River-water. He discussed the subject under three heads:—1. Analytical details of river-waters. 2. The various sources of impurity to which river-water is subject, and the means whereby purity is maintained by nature or may be effected by art. 3. The extent to which statistics warrant us in condemning or in approving the supply of river-water for drinking-purposes. Under the first head the author gives detailed analyses of water from the Thames from 1876-1879; analyses are also given of water from the rivers Nile, Severn, and Shannon. Under the second head is discussed the effect (1) of flood-water, which at first deteriorates and then improves the quality of river-water; (2) of peat, the quantity of which in a water is kept in check by "a," the inherent power that water possesses of self-purification, owing to the oxidation of the peat by the oxygen held in solution in the water, and "b," mechanical precipitation by admixture with coarse mineral matter suspended in the water; (3) of sewage matter. This, in the opinion of the author, is a most vital question. From inspection of the effect produced by sewage on rivers, from analyses of the river-waters, and from experiment, the author concludes that the oxidation of the organic matter of sewage takes place, when mixed with unpolluted water and allowed a certain flow, with extreme rapidity. The various methods of artificial purification are discussed; of these filtration through sand is preferred. Under the third category the arguments for and against the use of river-water for drinking-purposes are examined: it is shown that the death-rates of towns supplied by wells and of those supplied by rivers are practically alike, and that in London there is very little to choose, as regards mortality, between districts supplied with well-water and those supplied by river-water; and while admitting that, as a matter of sentiment, he would prefer well-water, the author contends that there is no reason for supposing that the *materies morbi*, whether it exists as a germ or not, can resist oxidation, which is efficient in destroying other organic matter, as proved by chemical analysis. The author finally submits the two following conclusions:—1. That when sewage is discharged into running water, provided the dilution with pure water be sufficient, the whole of it, after the run of a few miles, will be efficiently got rid of. 2. That facts indicate that whatever may be the actual cause of certain diseases, the *materies morbi* which finds its way into the river is destroyed along with the organic impurity.

Meteorological Society, March 17.—Mr. G. J. Symons F.R.S., president, in the chair.—Sir A. P. Bruce Chichester, Bart., W. H. Cochrane, Rev. H. Garrett, M.A., H. Jonas, J. Lingwood, Lieut.-Col. L. W. Longstaff, Rev. C. E. Sherard, J. H. Stewart, and Dr. W. J. Treutler were elected Fellows of the Society.—The following papers were read:—Thermometric observations on board the Cunard R.M.S.S. *Algeria*, by Capt. William Watson, F.M.S.—On the Greenwich sunshine records, 1876-80, by William Ellis, F.R.A.S.—At 8 p.m. the discussion was suspended in order to afford the Fellows an opportunity of inspecting a large number of new and interesting meteorological instruments which had been brought together for exhibition.

Entomological Society, March 3.—H. T. Stainton, F.R.S., &c., vice-president, in the chair.—Dr. Hy. Chas. Lang, of 41, Berners Street, and Mr. Frank Crosbie, of Barnet, were elected Ordinary Members of the Society.—Mr. Pascoe exhibited several species of scorpions in reference to a statement recently made elsewhere that scorpions had been known to sting themselves to death when surrounded by fire. This Mr. Pascoe doubted, and showed that the two common European species, *Scorpio europæus* and *Buthus occitans* were almost physically incapable of effecting such a purpose.—Mr. Stevens exhibited a dwarfed female specimen of *Plebius icarus* (*Lycæna alexis*).—The Rev. A. E. Eaton exhibited several plates of drawings of *Ephemeridæ*, part of a forthcoming work, and contributed remarks thereon.—The Secretary exhibited, on behalf of Mr. Geo. Francis, of Adelaide, the microscopical specimens referred to at the last meeting of the Society.—Mr. Howard Vaughan exhibited a series of *Cidaria russata* from Yorkshire and the Isle of Arran, in illustration of local variation of the species.—The Rev. H. S. Gorham read a further communication on the *Lampyridæ*, and also a paper giving the result of his observations on these insects with respect to their phosphorescence, which he believed to be due to sexual causes. With regard to the typical species of the family, he observed that in the most highly organised genera, such as *Lamprocera* and *Cladodes*, the light-emitting faculty did not appear to be developed in proportion with the rest of the organs, and that the eyes were also reduced "in a direct ratio with the light," being small and uniform in both sexes, "whilst the antennæ were developed in an inverse ratio as the phosphorescence was diminished."—Mr. C. M. Wakefield communicated a paper by Mr. Fereday containing descriptions of new species of the family Lucanidæ and the genus Chlenius.—The following papers were also communicated:—On synonyms of heterocerous lepidoptera, by Mr. Butler; and descriptions of Cetoniidæ and Cerambycidæ, from Madagascar, by Mr. Waterhouse.

Photographic Society, March 9—James Glaisher, F.R.S., president, in the chair.—A paper was read by the Rev. H. Lansdell, F.R.G.S., on a tour round the world, *viâ* Siberia and California, from which it appeared that photography in Russia and Siberia, in relation to its art-element, is in a very advanced condition. Some very interesting pictures of the eastern tribes of Russia and Siberia, bordering on China were shown, and also of the entire route, covering 25,510 miles.—A paper was also read by Capt. Abney, R.E., F.R.S., on the lateral spread of the image during alkaline development, showing that there was a travelling outwards of the deposit by alkaline development from the nucleus which forms the undeveloped image; this takes place in all directions, but when spreading laterally, it caused a blurring of the outline, seen in gelatine emulsion plates.

Institution of Civil Engineers, March 9.—Mr. W. H. Barlow, F.R.S., president, in the chair.—The paper read was on the purification of gas, by Mr. Harry Edward Jones, M.Inst.C.E.

Statistical Society, March 16.—Sir Rawson W. Rawson, C.B., K.C.M.G., in the chair.—Two papers were read, the first by Dr. T. Graham Balfour, F.R.S., on vital statistics of cavalry horses.—The second paper, read by Prof. Leone Levi, LL.D., was entitled a survey of indictable and summary jurisdiction offences in England and Wales, from 1857 to 1878, showing that the last twenty-two years have been on the whole favourable to the economic condition of the people, and the leading operating causes of crime have been less intense than in former years.

DUBLIN

Royal Dublin Society, February 16.—Physical and Experimental Science Section.—Wentworth Erck, LL.D., in the chair.—Physical observations of Mars, 1879-80, by Charles E. Burton, F.R.A.S. 22 sketches of the planet were obtained under favourable circumstances. To these Mr. Dreyer, of the Dunsink Observatory, added two, taken by himself with the "South" equatorial. The whole series, besides supporting the hypothesis that the principal markings are permanent as regards form and position, generally confirms the existence of the "canals" of Schiaparelli, adding perhaps a few which appear to have been detected for the first time in 1879, though it is not asserted that they are newly formed. The author's impression, from observation and comparison with earlier results, is that no rapid surface changes are now proceeding on Mars, and the great changes of appearance are due to formation and disappearance of cloud or mist in the planet's atmosphere. A number of areograpic positions of spots, determined by Kaiser's method, with the help of Marth's ephemeris, are included in the paper. The analogy between Mars and the earth is seemingly weakened by recent observations. —Notes from the Physical Laboratory of the Royal College of Science, by Prof. W. F. Barrett:—1. On the cause of the vibration in the Trevelyan rocker. The author attributes the motion to the force exerted by a thin layer of gas between the hot rocker and the cold support. As long as there is sufficient difference of temperature between the two surfaces, the supporting edges of the rocker are alternately repelled from the cool

leaden block in the same manner as the vanes of a radiometer are repelled from the relatively cool sides of the surrounding glass envelope.—2. On the effect of temperature on the illuminating power of coal-gas.—On a new harmonic relation between the lines of hydrogen, by G. Johnstone Stoney, D.Sc., F.R.S. The author pointed out that the stellar line H_1, which Mr. Huggins's investigations show to be probably a hydrogen line, stands in a simple harmonic relation with the known hydrogen line near G; H_1 being the 35th, and the line near G the 32nd, harmonics of a vibration the periodic time of which is $\tau \div 72{\cdot}003$, where τ is the time that light takes to advance a millimetre in air. The other known hydrogen lines, viz., C, F, and h, are already known to be the 20th, 27th, and 32nd harmonics of another vibration the periodic time of which is $\tau \div 76{\cdot}2$.—Natural Science Section, with which the Royal Geological Society of Ireland is associated.—G. H. Kinahan, M.R.I.A., in the chair.—The Chairman, as president of the Royal Geological Society of Ireland, delivered the anniversary address.—V. Ball, M.A., F.G.S., read a paper on the evidence in favour of the existence of floating ice in India during the deposition of the Talchir (Permian) rocks. In this communication the author gave a *resume* of the facts which are held by Indian geologists to prove that during a part of the Talchir period the climate of Peninsular India was sufficiently cold, during the winters at least, to cause the formation of land-ice on the margins of the great lakes which then existed. The facts are similar to those employed to establish the glacial period of Europe. There is a boulder-bed which contains huge masses of rock enveloped in fine silt. In some cases it is demonstrable that these boulders have been carried from long distances in a direction contrary to the present slope of the surface. In others, but less commonly, polished and striated boulders have been found resting on scored and striated surfaces. The fossils of the Talchir rocks, consisting of a few ferns and equisitaceæ—all previous periods having been azoic—are not inconsistent with a mild, temperate climate. Reference was made by the author to the Karroo beds of South Africa and the Permian breccias of England, which are likewise believed to have had a glacial origin.

PARIS

Academy of Sciences, March 15.—M. Ed. Becquerel in the chair.—The following papers were read:—On a particular development of the perturbative function, by M. Tisserand.—On the compensation of temperatures in chronometers, by M. Phillips.—On the hypothesis of Laplace, by M. Faye. He shows the adverse bearing of various modern discoveries on it.—Reply to M. Berthelot's observations on hydrate of chloral, by M. Wurtz.—Action of oxygenated water on oxide of silver and on metallic silver, by M. Berthelot. Oxygenated water forms with silver oxide, in equal equivalents, a first unstable compound, $Ag_2O_3 3HO_2$, with separation of metallic silver. This is almost immediately decomposed into hydrated sesquioxide, water, and oxygen—with liberation of heat. If the silver oxide is in excess the action ends there; but if there is an excess of oxygenated water the sesquioxide acts in its turn on this, reproducing $Ag_2O_3 3HO_2$, which is again decomposed, and so on, till total destruction of the oxygenated water. The same theory accounts for the decomposition of oxygenated water in contact with metallic silver.—Memoir on the temperature of the air at the surface of the ground and to 36 m. depth, also on the temperature of two pieces of ground, one bare, the other covered with sod, during 1879, by MM. Becquerel. The results seem mainly to confirm those of previous observations.—Present state of the question as to the interoceanic canal; letter from M. De Lesseps to M. Larrey. He gives, among other news, a local account of the recent earthquake at San Salvador.—On a microphonic apparatus receiving speech at a distance, by MM. Bert and D'Arsonval. They use a plate of hardened rubber, through which passes the fixed carbon. The other carbon is carried by an iron rod which can turn about an axis, and whose mobility is regulated by a movable magnet. When the magnet is distant, the rod can turn on its pivot indifferently, but in the opposite case it is strongly directed, giving vibrations of very small amplitude and great rapidity. Speaking loudly at 4 or 5 m. from this instrument (or with low voice near), the speech is distinctly transmitted.—Practical rules for the establishment of telodynamic transmissions, by M. Leaute.—On the economic product of electric motors, and on measurement of the quantity of energy which traverses an electric circuit, by M. Deprez.—Laws concerning the distribution of the stars of the solar system, by M. Gaussin. Three more are given.—On the systems formed of linear equations with a single independent variable, by M. Darboux.—On the reduction of linear substitutions, by M. Jordan.—On the equation with partial derivatives of potential, by M. Picard.—On a new telemeter, by M. Landolt. This is based on the principle of refraction through a prism of variable angle, composed of two elementary prisms of the same power turning one on the other with the same velocity in opposite directions. The two have a central aperture concentric with the axis of rotation, and equal to half the surface of section of the bundle of luminous rays which enters the eye. The observer thus looks at once through the apertures and through the prisms. In one position of the prisms the object is seen simple, but on turning it is doubled, and from the amount of rotation necessary to bring the two images to a given position, the distance may be deduced. The instrument serves also for measurement of the size of inaccessible objects.—Application of the telephone to measuring the torsion of the motor-shaft of engines in motion, by M. Resio. Two similar copper wheels with equidistant palettes are fixed on the shaft, and turn before the core-ends of two similar bobbins wound oppositely, the wire forming part of a telephone circuit. While there is no torsion and the palettes therefore pass the cores simultaneously, the telephone is silent; but torsion makes it sound. By displacing the second bobbin on a graduated circle, silence is again had, and the amount of torsion can be estimated.—On a process for the measurement of high temperatures, by MM. Crafts and Meier. This is an adaptation of the gas-thermometer.—Electrolysis of malonic acid, by M. Bourgoin.—Synthesis of ulmic matters, by M. Millot.—On the products of decomposition of proteic matters, by M. Bleunard.—On the anatomical characters of the blood in phlegmasia, by M. Hayem.—On the digestive action of the juice of papaya and of papaïne on the sound or pathological tissues of the living being, by M. Bouchut. All organised tissues, even when living, may be peptonised by this substance (papaïne), which is the *vegetable peptone*.—On anchylostomiasis, by MM. Concato and Perroncito.—On the artificial production of felspars with base of baryta, strontia, and lead, corresponding to oligoclase, labradorite, and anorthite, by MM. Fouque and Lévy. They operated by producing crystallisation at a high temperature, below the point of fusion, but near it.—Eruption and fall of volcanic dust at Dominica on January 4, by M. L. Bert. *Inter alia*, the cloud-carrying dust is shown to have travelled very slowly, though the wind was high.—Examination of the volcanic dust (just referred to) and the water which accompanied them, by M. Daubrée. The presence of innumerable crystals of pyrites in the powder is specially notable; also the presence of galena.—Separation of minerals whose density is greater than that of quartz with the aid of fused mixtures of chloride of lead and chloride of zinc, by M. Breon.—*Apercu* on the genesis of the mineral waters of Savoy, by M. Levy.—Composition of the mineral waters of Bussang (Vosges), by M. Willm.

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